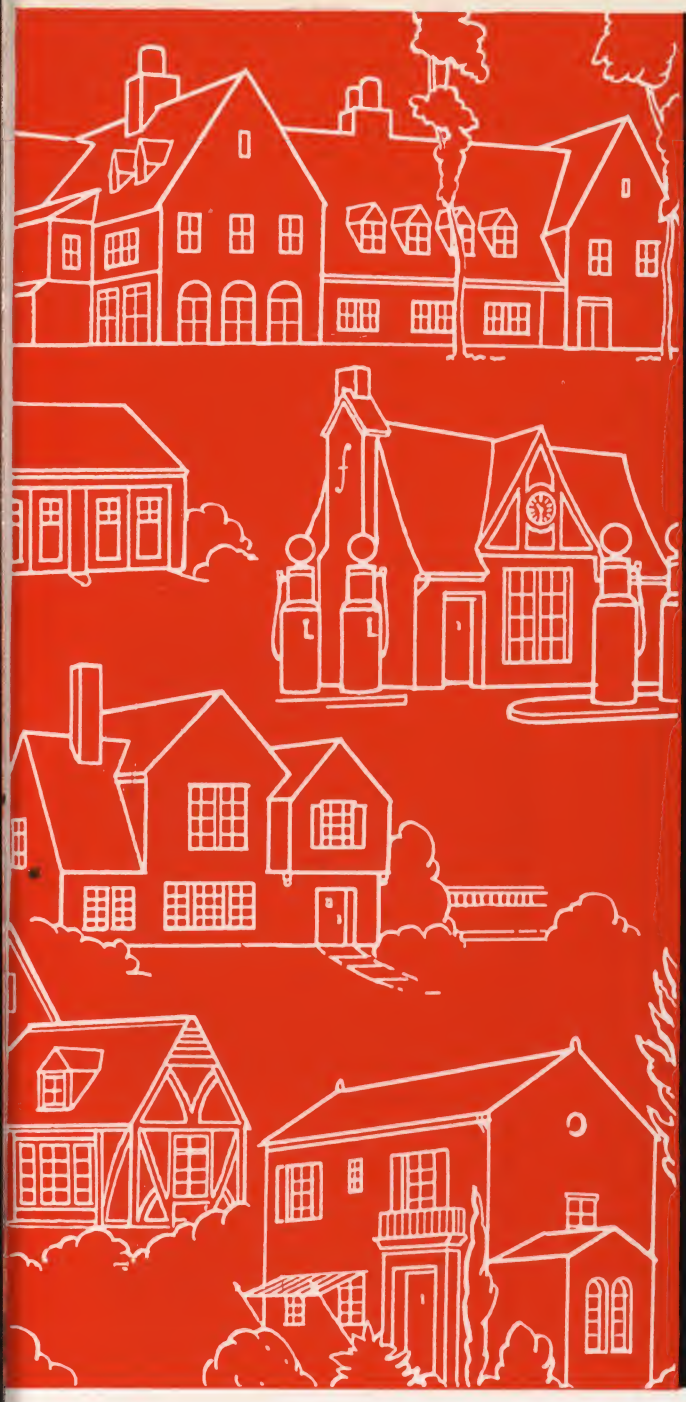

How to Build with

MAC-MAR STEEL FRAMING

MANUFACTURED BY
STEEL FRAME HOUSE COMPANY
SUBSIDIARY OF
McCLINTIC-MARSHALL CORPORATION
PITTSBURGH, PA.

MAC-MAR STEEL FRAMING

Made by

STEEL FRAME HOUSE COMPANY

SUBSIDIARY OF McCLINTIC-MARSHALL CORPORATION

PITTSBURGH, PA.

DISTRIBUTORS IN ALL PRINCIPAL CENTERS

Products

MAC-MAR STEEL FRAMING for homes and other buildings, including all Structural Elements, Attachment Devices, etc.

Also Mac-Mar Steel Stud Partitions for fireproof buildings; Mac-Mar Standardized Steel Garages; Mac-Mar Junior Trusses (steel joists); Brisbane Steel Frame Cottages and Mac-Mar Poster Panels.

MAC-MAR STEEL FRAMING

Patents Pending

Uses and Advantages

Mac-Mar Steel Framing is adapted for the construction of any building three stories or less in height, having live floor loads not exceeding 100 lbs. per sq. ft.

It may be employed for taller buildings in conjunction with a structural steel frame. It is particularly adapted to homes and residences of all types and sizes.

Fig. 1. Mac-Mar Steel Framing for a House in Indianapolis
FREDERICK WALLICK, Architect

Fig. 2. Same House Finished
Mac-Mar Steel Framing fits any architectural style

General Information

Any builder familiar with standard methods of framing structures in wood can erect Mac-Mar Steel Framing. This modern system of construction employs rigid, durable steel for sills, studs, girts, and plates, and for floor beams and rafters, each member corresponding to a similar member of wood in ordinary frame buildings. The members are bolted together on the job and the contractor merely substitutes a wrench and screwdriver for hammer, square, rule and saw.

All parts of Mac-Mar Steel Framing are fabricated to fit the structure for which they are ordered. No cutting or fitting on the job.

The special feature distinguishing Mac-Mar Steel Framing is the use of members perforated on 2-in. centers (sills, girts, plates and studs), permitting absolute flexibility of design to any multiple of 2 in. for allover dimensions. Fractional dimensions can be provided by special offsets if necessary. Furthermore, all studs are normally assembled on 16-in. centers, permitting the use and attachment of all standard building materials by means of labor-saving clips fitting the perforated members.

It is equally suited for the development of small, fireproof apartment houses, and for club-houses, small hospitals, and schools, small garages, gasoline filling stations, one- to three-story tax-payer buildings, and all other structures which have usually been framed in wood.

Mac-Mar Steel Framing is rigid, durable, noncombustible, and obviously cannot be attacked by termites, rot, fungus, or vermin.

It produces a substantial fireproof construction at low cost. It is free from warping, twisting, shrinkage, and thus assures freedom from plaster cracks due to structural causes.

Mac-Mar Steel Framing produces buildings that are remarkably soundproof, weathertight and efficiently insulated against heat losses.

Adapted to All Designs

No limitation is imposed upon the designer in the shape or form of the building to be constructed with Mac-Mar Steel Framing. Irregular roof lines, dormers, gables, hip roofs and projecting bay windows as readily framed in steel as in any other structural material. Additions and alterations are effected with equal simplicity.

Fig. 3. Complete Mac-Mar Steel Frame Ready to Ship

Continued on next page

MAC-MAR STEEL FRAMING FOR RESIDENCES AND OTHER BUILDINGS

Service to Architects

The STEEL FRAME HOUSE COMPANY offers its fullest co-operation to the architect and owner contemplating the use of Mac-Mar Steel Framing. Our distributors in all parts of the country can furnish preliminary information and a complete engineering staff at the home office is at your service.

The architect will encounter no unusual problems in the use of Steel Framing. The building should be designed and detailed exactly as for any other materials.

These plans and specifications should then be submitted to our home office in Pittsburgh where framing plans, heating and plumbing layouts, specifications and a complete estimate of cost will be promptly prepared for the consideration of the architect and owner.

Fig. 4. Tydol Chain Gasoline Filling Station with a Mac-Mar Steel Frame
One of many similar stations ordered by the Tidewater Oil Co.

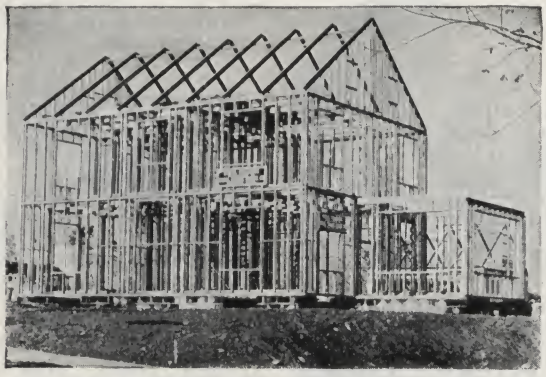

Fig. 6. Mac-Mar Steel Frame for a House at Syracuse, N. Y.

Fig. 5. Arlington Club House at the Famous Arlington Racetrack, Chicago
Built in record time with Mac-Mar Steel Framing
BENJAMIN H. MARSHALL, Architect

Strength and Durability

All structural members employed in Mac-Mar Steel Framing are of hot-rolled, copper-bearing steel except standard I-beams and channel sections used for girders, floor joists and rafters which are of hot-rolled, open hearth, structural steel according to A. S. T. M. standards. All members are further protected after fabrication with a coat of anti-corrosive paint known as the most effective protective coating available for steel.

More than adequate strength is assured with Mac-Mar Steel Framing because more steel is used than is actually required for structural purposes in order to provide for the attachment of standard building materials.

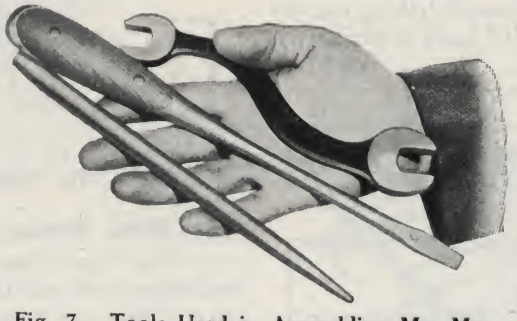

Fig. 7. Tools Used in Assembling Mac-Mar Steel Framing—a Wrench, Screwdriver and a Connecting Pin

Easy to Build

Because Mac-Mar Steel Framing follows well-established principles of design, any contractor familiar with present methods of construction can assemble Mac-Mar Steel Framing and attach thereto any type of building material normally applied adjacent to the frame.

The following pages show the elements of Mac-Mar Steel Framing, the sequence of operations in assembling them for all types of buildings, and standard methods of attaching all normal building materials.

Fig. 8. Mac-Mar Steel Framing Has Reserve Strength for Rigidity and Durability
Hot-rolled, copper-bearing steel is used

Fig. 9. Mac-Mar Steel Framing Is Easy to Erect
No cutting or fitting on the job

Continued on next page

THE MEMBERS EMPLOYED IN MAC-MAR STEEL FRAMING

Only four basic types of members plus wire cable wind bracing are required for the construction of a Mac-Mar Steel Frame. Typical elements are described on this page.

(1) Studs

Mac-Mar Steel Studs are made of two hot-rolled, copper-bearing steel angles, mill fabricated to length and assembled with bolted, riveted or welded clips forming a unit 3¾ in. deep from face to face. All members are perforated with $\frac{7}{16}$-in. holes 2 in. on centers. Short lengths of these units are used for framing openings and similar details.

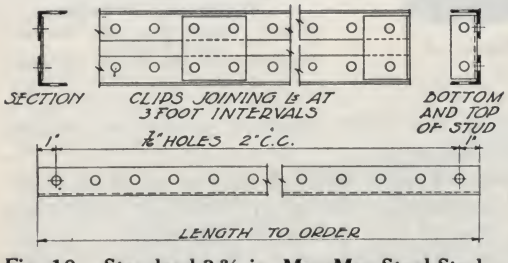

Fig. 10. Standard 3¾-in. Mac-Mar Steel Stud Made Up of Two Angles with Spacing Clips

Fig. 11

(2) Sills (Also Girts and Plates)

Sills, girts and plates are identical in Mac-Mar Steel Framing. They are made of two channels having flanges perforated on 2-in. centers, assembled back to back with

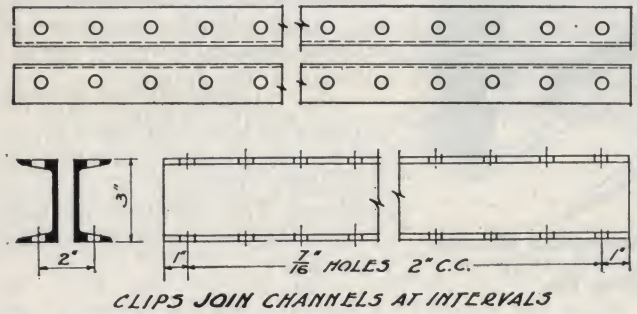

Fig. 12. Sills, Girts, and Plates Are Made of Two Standard Channels

clips joining the channels at required intervals. Studs, beam connections and rafter connections are bolted to the sills, girts, or plates at any desired spacing which is a multiple of 2 in. Odd dimensions are fitted by means of offsets.

(3) Girders and Floor Joists

Girders used to span basement areas are standard structural steel I-beams of whatever size is required to carry the load across the given span.

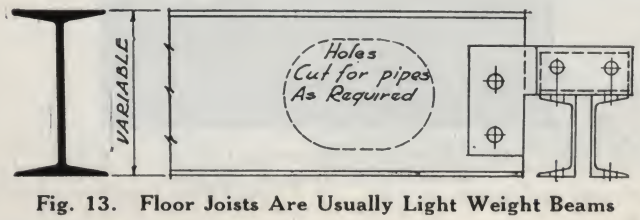

Fig. 13. Floor Joists Are Usually Light Weight Beams

Floor joists are usually made of light I-beam sections. These joists are connected to sills, girts, or plates with special end connections similar to those shown in Fig. 13. Where pipes or conduit pass through the floor across the floor joists, holes are cut in the webs at the required points. This cutting is done at the mill.

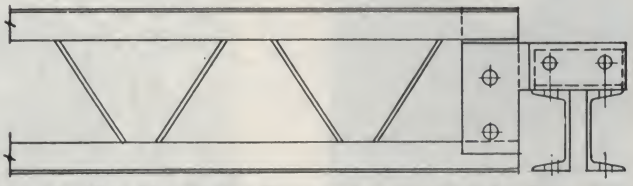

Fig. 14. Mac-Mar Junior Trusses Are Optional for Floor Joists

An optional type of floor joist is the Mac-Mar Junior Truss. This is a steel joist having flat top and bottom chords, with a web made of welded bars in the form of a Warren truss. Where these members are used as floor joists, pipe and conduit can be run through the webs. See Fig. 14.

(4) Rafters

Rafters are made of standard channels to which are bolted various types of ridge and eave connections in accordance with job requirements. The channels may be perforated on their flanges at 2-in. intervals, or may have web perforations to allow the bolting of a nailing stringer as required.

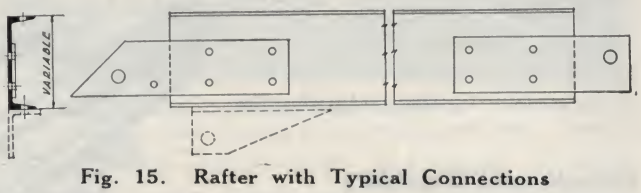

Fig. 15. Rafter with Typical Connections

(5) Wind Bracing

Mac-Mar Steel Frame buildings are thoroughly braced against wind stresses and distortions by means of steel cables and turnbuckles as pictured in Figs. 16, 24 and 25. The cables pass through center of studs.

All other special elements required in any building are mill-fabricated from these standard members.

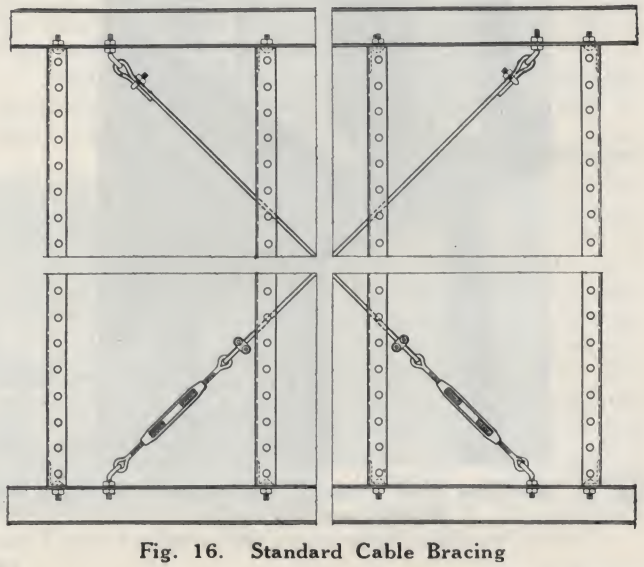

Fig. 16. Standard Cable Bracing

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HOW TO ERECT MAC-MAR STEEL FRAMING

Foundations

Foundations must be brought true to level and grade and anchor bolts inserted on center line of sills.

(1) Set Girders and Basement Columns

Large girders spanning basement areas are set in notches in foundation walls, bringing their top flanges level with the top of foundation. Interior columns of standard I-beams are set on footings in the customary manner. Girders can usually be slid over foundation walls without special rigging and fitted as shown in Fig. 17. Girders are punched at mill to receive columns and sills.

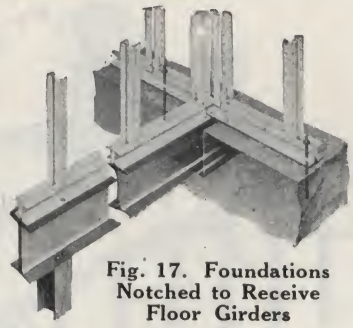

Fig. 17. Foundations Notched to Receive Floor Girders

(2) Set Sills

Sills are set on foundations and joined at corners with bolted bottom plate shown in Fig. 18. Before tightening nuts over anchor bolts, the sills are shimmed to exact level and grade and grouted with cement mortar. Anchor bolts, which have previously been set in foundations on center lines of sills, are then made fast.

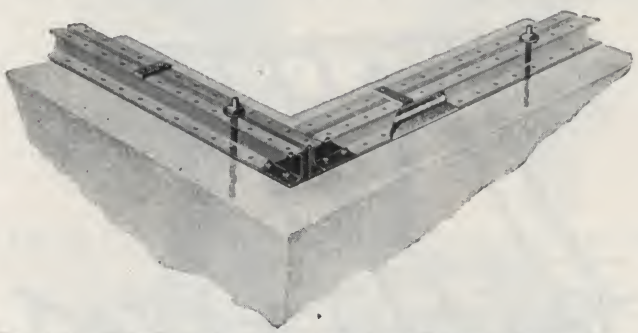

Fig. 18. Sills Bolted at Corners, Leveled and Grouted with Cement

(3) Set Floor Joists

Floor joists are laid across the first floor spans at required intervals as shown in Fig. 19. The angle connection is then bolted to the sill at the proper point and to this the floor joist hanger is bolted as shown in Fig. 20.

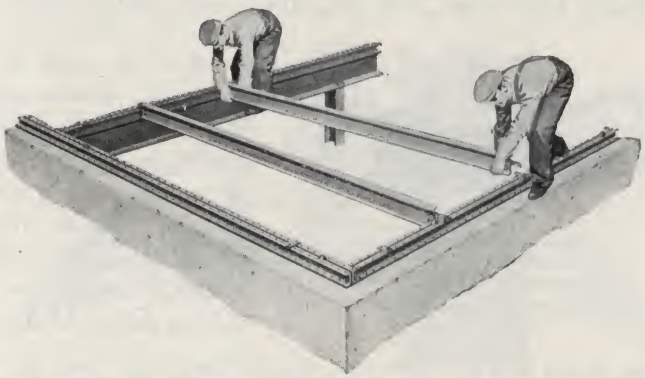

Fig. 19. Floor Joists Laid Across Spans at Proper Intervals

Since the sills are properly aligned and level, the resulting floor comes true without further adjusting or fitting. Headers framing interior floor openings are similarly bolted to the proper floor joists.

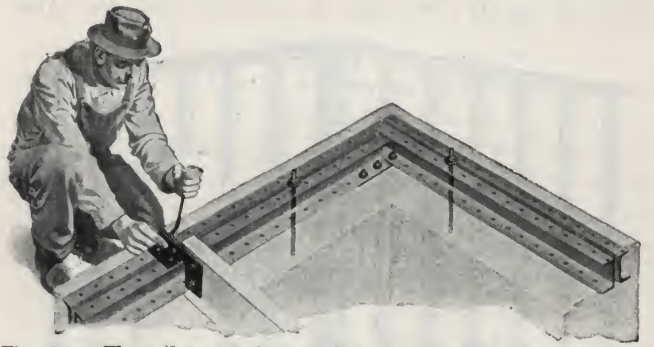

Fig. 20. Floor Joists Bolted to Sills, Using Angle Connections Previously Installed

(4) Assemble and Erect Studs

Instead of erecting studs individually, it is much easier to assemble panels of studs in a horizontal position as shown in Fig. 21. A girt piece is bolted to the heads of the studs and any window or door openings are fitted and assembled at the same time. The bottom ends of the studs rest on the sill. The entire panel is then raised as shown in Fig. 22, the the studs catching in the space between the two channels forming the sill. While the panel is temporarily held upright by one man, the other completes the bottom connections, bolting the studs to the sill.

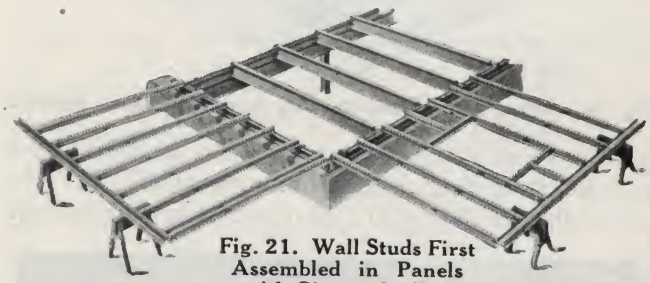

Fig. 21. Wall Studs First Assembled in Panels with Girt at the Top

Fig. 22. Assembled Panels Lifted and Bolted to Sills

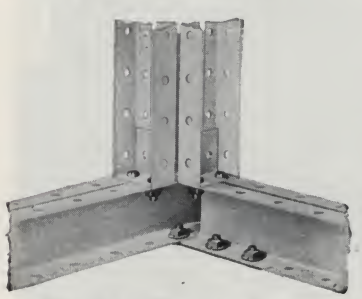

Fig. 23. Typical Corner Connection

A similar panel is then raised at the adjacent corner and the corner posts bolted together at the top with the connecting plate shown in Fig. 28. Corner posts are formed of three studs as shown in Figs. 21, 22 and 24, forming attaching points at both exterior and interior angles for application of finishing materials. See also Fig. 23.

Continued on next page

(5) Install Wind Bracing

Lateral stiffness to resist wind pressures is introduced into the Mac-Mar Steel Frame by means of wire cable bracing as illustrated in Figs. 24 and 25. This

Fig. 24. Wire Cable Wind Bracing Supplies Lateral Stiffness

bracing consists of U-bolts fastened to the sill and girt or plate, steel wire, clamps, and turnbuckles. The wire is installed on the center line of studs, passing through

Fig. 25. Typical Wind Bracing on Panel

the space between the angles forming each stud, and the turnbuckles are then tightened until the structure is absolutely plumb and true. Similar cable bracing is used to stiffen roof panels where shown on drawings.

(6) Set Second and Third Floor Joists

Second and third floor joists are installed in exactly the same manner as the first floor joists (see Figs. 19 and 20). The connections are identical because the same type of member forms the sill, girt, or plate.

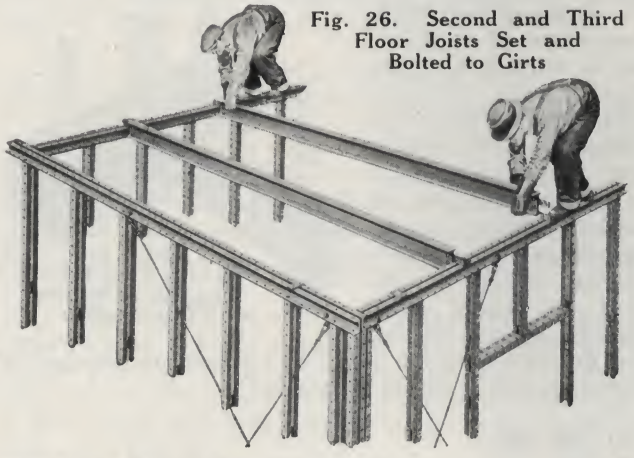

Fig. 26. Second and Third Floor Joists Set and Bolted to Girts

(7) Erect Second Floor Studs

All studs for the upper floors, walls and bearing partitions are assembled in a horizontal position on tem-

Fig. 27. Second Floor Studs Assembled in Panels and Raised from Within

porary planks laid over the upper floor joists. When panel is thus prepared, it is lifted in place as shown in Fig. 27, with the bottom of the studs resting in the groove of the girt. Girts are bolted at corners with a special angle connection shown in Fig. 28.

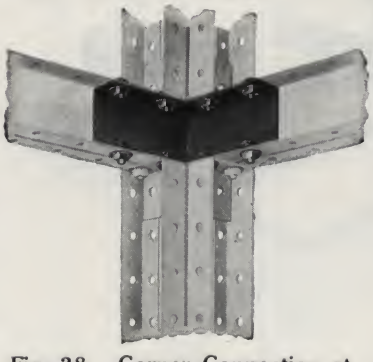

Fig. 28. Corner Connection at Girt

In this manner, the entire frame is assembled and carried up to the eave line, with wind bracing installed and the entire structure made true and rigid.

Continued on next page

(8) Rafters and Roof Details

At each rafter location angle connections (see Fig. 29) are bolted to the plate. The rafters are then bolted through their end connections, using a single bolt as shown in Figs. 30 and 31. The end connections which are attached to the rafters vary in type according to the style of the roof.

A pair of rafters, having thus been hinged at the eaves, is then raised as shown in Figs. 32 and 34, and the ridge connection is completed with a single bolt as shown in detail in Fig. 33.

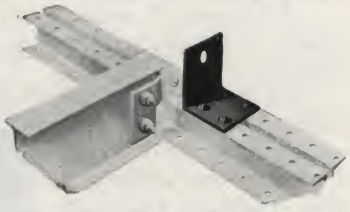

Fig. 29. Rafter Connections Bolted to Plates

No ridge board is used. In its place, two light angles are supplied which are bolted to the lower edges of the rafters at either side of the ridge connection.

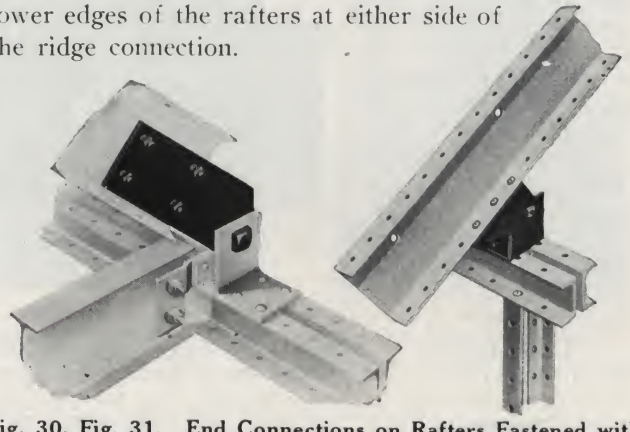

Fig. 30, Fig. 31. End Connections on Rafters Fastened with a Single Bolt (Forming a Hinge) to the Rafter Support

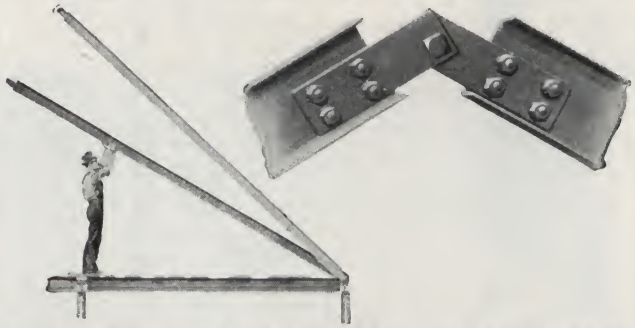

Fig. 32, Fig. 33. Rafters Raised from the Eave Hinge and Each Pair Joined with a Pin-connected Ridge Construction

Fig. 34. Three Men Quickly Raise Each Pair of Rafters and Complete the Ridge Connection

All special roof details, including gables, dormers, hip roofs, gambrel roofs and the like, are assembled following the same principles.

(9) Partitions (Non-bearing)

Non-bearing partitions do not rest on the partition sills but are suspended from floor joists above. The bottom ends of the studs are spaced by bolting them to a flat perforated steel plate which in turn is attached to floor joists below and later becomes embedded in the concrete structural floor. The tops of studs are attached to two angles thus forming a panel, which is then raised into place and top angles securely bolted to floor joists directly above.

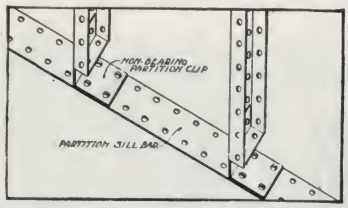

Fig. 35. Bottom Plate of Non-bearing Partitions

(10) Completed Frame

In this manner, all parts of a Mac-Mar Steel Frame structure are assembled, ready for the attachment of other building materials. The isometric drawing below (Fig. 36) shows how the typical members are used and their relationship to each other.

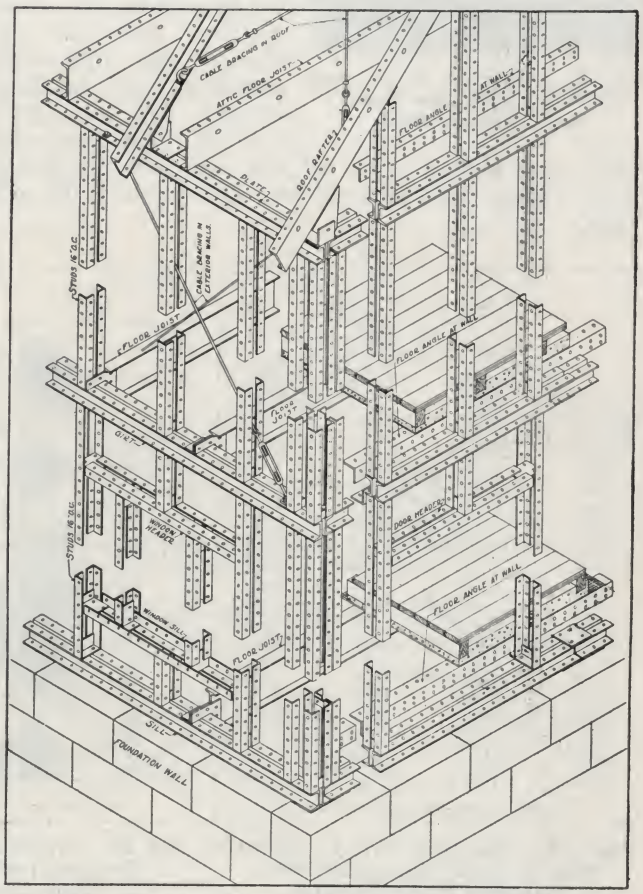

Fig. 36. Diagram Showing Relationship of All Typical Members

It is to be especially noted that there is no cutting, fitting or fabrication required on the job. All elements are prepared at the mill and properly numbered to fit together in accordance with the erection diagram prepared by the Engineering Department of the Steel Frame House Company. Assembly is exceedingly simple if these instructions are followed.

Continued on next page

INSTALLATION OF MECHANICAL EQUIPMENT

Provision is made in the design of Mac-Mar Steel Framing for the installation of all types of mechanical equipment. Plumbing and heating contractors and electricans follow their usual practices in making their installations, except locations are predetermined.

(1) Electric Wiring

Where armored cable or non-metallic sheathed cable are specified for electrical circuits, the cable is strung through the Mac-Mar Steel Studs in the space between each pair of perforated angles. This space will receive any standard type of armored cable or non-metallic sheathing. Outlet boxes are secured to perforated metal strips, wired or bolted to adjacent studs as shown in Figs. 37 and 38.

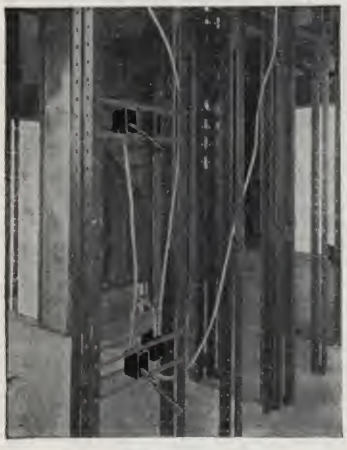

Fig. 37. Electric Wires and Flexible Cable Are Easily Run Through Studs

Where rigid conduit is specified, it is laid in the floors like other pipe systems, and may be carried up into the partitions by bending around sills or girts. Conduit may also be run in the hollow faces of sills and girts for baseboard outlets with vertical lines bent around the sill flanges.

webs of the latter are perforated at the mill for duct installations.

Heating plans and requirements should be submitted to the Steel Frame House Company.

(3) Piping Systems of All Kinds

All types of heating and plumbing pipe lines are readily installed in Mac-Mar Steel Framing, following standard methods.

Vertical lines of small pipes are run through partitions with angle offsets around girts and plates. Larger sizes, including soil pipes, are run through chases provided in the frame for this purpose; the girts and plates being cut away at the mill at the required points. Large sizes of soil pipes that will not fit in a 3¾-in. partition are framed around in the usual manner.

Fig. 41. Typical Installation of Pipes and Warm Air Ducts

Horizontal lines are carried between or through the floor beams; in the latter case the beam webs are perforated at the mill at the proper points.

Where flexible or semi-flexible copper pipe is specified for water lines. this may be run without special provision through any part of the framing, except that holes are provided to carry pipes through horizontal members.

Pipes are supported with standard hangers bolted or wired to the structural members.

To simplify installation problems, complete heating and plumbing plans should be supplied to the Steel Frame House Company Engineering Department together with diagram showing preferred location of all pipe lines.

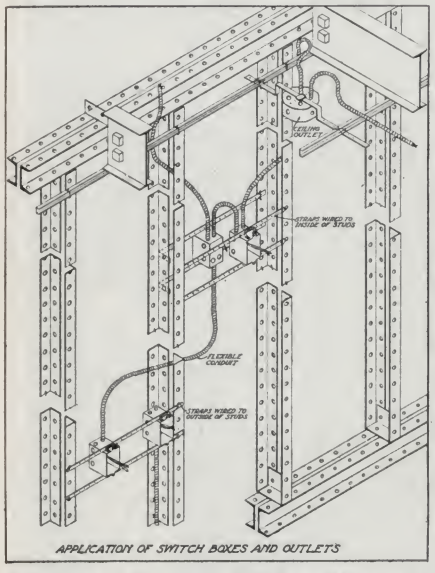

Fig. 38. Standard Wiring Materials May Be Used Throughout Mac-Mar Steel Frame Buildings with Utmost Simplicity

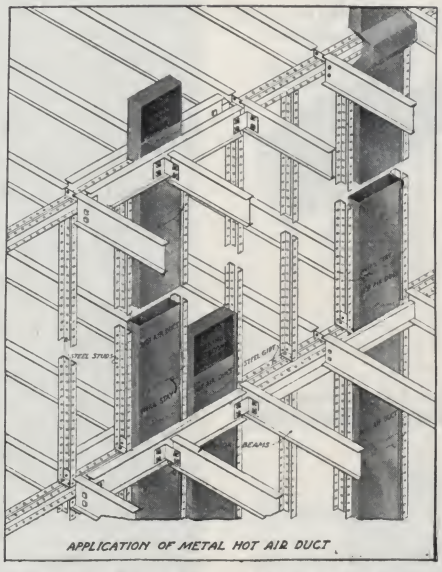

Fig. 39. Provision Is Made in the Steel Framing Itself for Introducing Warm Air Ducts Wherever Required

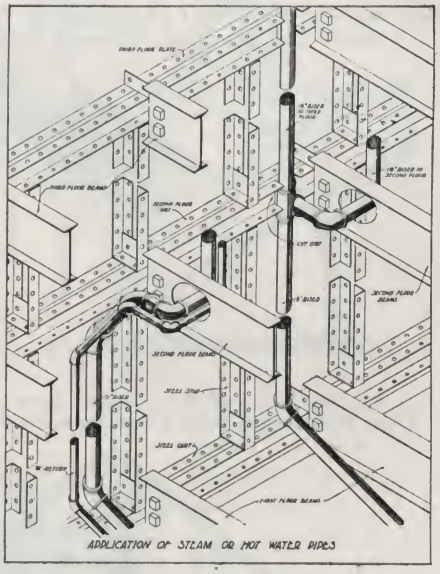

Fig. 40. Heating and Plumbing Systems of All Types Are Installed Through Openings Provided for the Purpose

(2) Warm Air Ducts

Special provision is made in the framing plan for rectangular warm air ducts where they are carried through girts or plates of outside walls or interior partitions. The ducts used are the standard 3½-in. ducts employed with wood framing. They are supported with wire stays fastened through the perforations of adjacent studs. Horizontal ducts are carried between floor beams where possible, but when run across the floor beams, the

Continued on next page

HOW TO APPLY STANDARD BUILDING MATERIALS

(1) Forming Fire-resistive Concrete Floors

To gain full advantage of the fireproof characteristics of Mac-Mar Steel Framing, the structural floor slabs should be of concrete or gypsum. Standard methods used for forming such floors over steel joists are followed.

(A) With Fibrous-backed Wire Fabric—

This material, consisting of a welded galvanized wire mesh to which is attached a heavy fibrous waterproof backing, is usually supplied in large rolls. A sheet is unrolled across the floor span, as shown in Fig. 42, and cut to length. One end of the sheet is then clipped

Fig. 42. Unrolling Fibrous-backed Wire Fabric Over Steel Joists

Fig. 43. Fabric Is Fastened at One End and Stretched Taut

to the nearest sill, using labor-saving wire clips made for the purpose. The sheet is then stretched from the other end until taut and again clipped to the adjacent sill or girt. Similarly, the fabric is fastened with clips to each

Fig. 44. Where Wood Top Floor Is Specified, Sleepers Are Set in Place Before Pouring Concrete

of the intervening floor joists. Repeat the process with each additional sheet overlapping the other in accordance with manufacturer's instructions until the area is completely covered.

If a top finished floor of wood is specified, screeds or sleepers are installed, as shown in Fig. 44. The sleepers are lifted 1 in. off the fabric by means of metal sleeper chairs (No. 301). See Figs. 44 and 46.

The floor is then ready to be poured as shown in Fig. 45. The waterproof fibrous backing of this reinforcing fabric will permit the use of any desired water-cement ratio in the mix and will function as a form while the mortar sets. The reinforcing wires become embedded in the slab.

Concrete slabs of this type are usually from 2 to 3 in. in thickness. When screeds are not used for nailing

Fig. 45. Concrete of Any Desired Water-cement Ratio May Be Poured Directly on Fibrous-backed Wire Fabric

the top floor, the cement is troweled to a smooth finish ready to receive linoleum, rubber tile or other flooring.

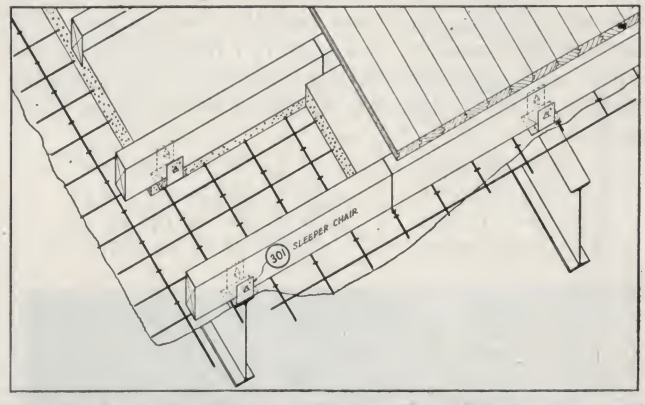

Fig. 46. Isometric Diagram Showing Floor Construction with Fibrous-backed Wire Fabrics

(B) With Wood or Metal Forms—

Similarly, concrete slabs may be poured over tem-

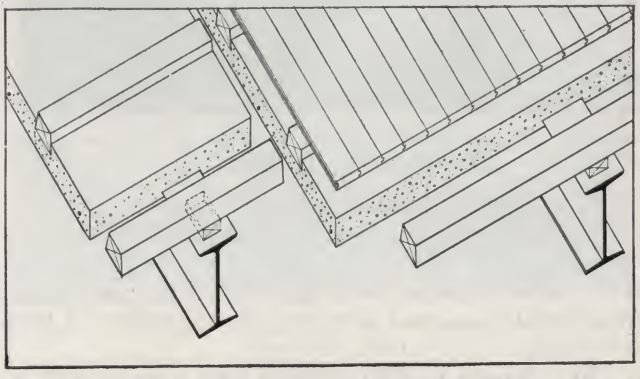

Fig. 47. Diagram Showing Concrete Slab Floors Poured Over Removable Wood or Metal Forms

porary wood or metal forms supported on the lower flanges of the steel joists with top surfaces approximately

Continued on next page

½ in. below the top flange. Rod or wire reinforcing is laid across the joists and the slab is poured as indicated in Fig. 47. When the floor has hardened, the forms are removed, and are re-used for other floor areas.

(C) With Ribbed Sheet Metal or Metal Lath—

Sheet metal with a stiffening rib, as shown in Fig. 48, may be used as a form for these concrete slabs. It is merely laid across the steel joists with overlapping

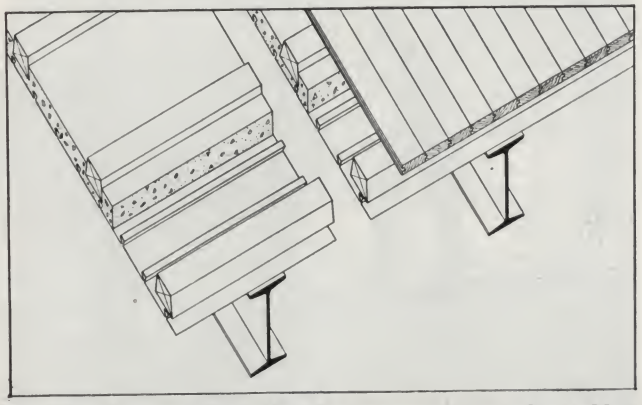

Fig. 48. Concrete Slab May Be Cast on Ribbed Sheet Metal Which Is Laid Across the Steel Joists

seams and the concrete is poured with or without additional reinforcement.

Ribbed metal lath is also commonly used, as shown in Fig. 49. It is laid across the joists and clipped thereto with labor-saving wire clips made for the purpose. The concrete used must be of a very dry mix to prevent the cement and aggregate falling through. The following weights of metal lath are specified by the Steel Joist Institute:

Joist Spacing	Type of Laths
Up to 19-in. centers	⅜ in.—3.4 lb. per sq. yd.
19 to 24-in. centers	⅜ in.—4 lb. per sq. yd.
24 to 30-in. centers	¾ in.—46 lb. per 100 sq. ft.

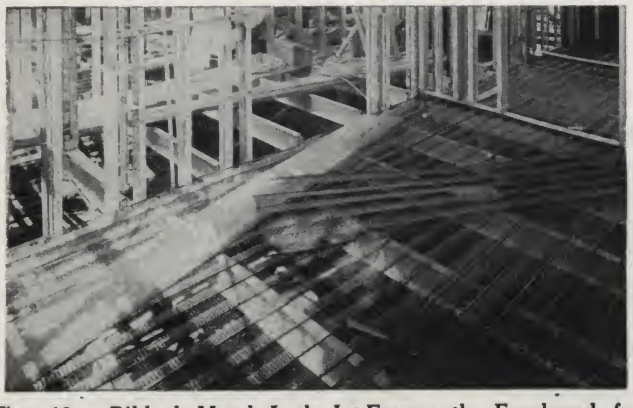

Fig. 49. Ribbed Metal Lath Is Frequently Employed for Forming Concrete Slab Floors

(D) Other Types of Floors—

Complete data sheets and construction information will be supplied where any other type of floor is specified. These types include pre-cast and cast-in-place gypsum slabs, pre-cast concrete, wood plank and steel deck floors.

Any desired type of finished floor surface may be installed in Mac-Mar Steel Frame buildings. The method of laying hardwood strip and plank flooring is indicated in Figs. 46, 47 and 48. Wood block flooring may be cemented directly to the concrete slab. Linoleum, rubber tile, cork tile, etc., are likewise cemented to the slab. Ceramic tiles, slates and stones are set in mortar directly on the concrete.

(2) Exterior Wall Construction

Mac-Mar Steel Frame buildings should have exterior walls of masonry in some form. This includes brick, stone, and stucco. Wood siding cannot be advantageously used, but where the architectural effect of clapboards is desired, an asbestos cement sheathing, resembling clapboard siding, may be applied to the frame. Half-timbering work employed with stucco may also be attached in the manner shown for interior wood trim.

Brick and stone facings are constructed as veneers over the steel frame. Stucco is applied to any standard

Fig. 50. Mac-Mar Steel Frame Houses Have Masonry Exteriors of Brick, Stone or Stucco
A group at Philadelphia, Pa.

type of stucco base which in turn is attached directly to the frame. The rigidity and freedom from distortion or warping of Mac-Mar Steel Framing assures superior results and freedom from cracking of stucco or masonry facings.

Insulation of exterior walls is effected either on the outside face or the inner face of the studs or both, as the designer may specify. The attachment of all basic types of insulating materials is indicated on the following pages.

Any combination of materials may be employed with Mac-Mar Steel Framing. The ground story, for example, may have a stone facing 8 in. deep, and the

Fig. 51. Stone and Stucco Were Used on This House in Detroit, Mich.
Clair Ditchy, Architect

upper stories, or some part thereof, may have a stucco finish. Provision for such changes in material is made in the frame itself with suitable overhangs to align the surfaces.

Continued on next page

(3) Application of Plaster and Stucco Bases and Insulating Boards

Attachment methods have been developed for the application of all types of wallboards, insulating boards, metal lath, wire fabric and other standard building materials to Mac-Mar Steel Framing.

(A) Wallboards and Insulating Boards—

Fibrous Wallboards—Applied to Mac-Mar Steel Framing by means of a special expanding nail (No. 201) illustrated in Fig. 52. The board is set against the frame and a workman from within punches a hole through the board opposite one of the perforations in the steel stud. The workman outside drives an expanding nail, to which has first been applied a washer or masonry anchor, through the perforation thus formed. The process of driving the nail expands the inner end until it fits tightly into the perforation in the steel stud. The harder the nail is driven, the tighter the grip. Special prong washers are used to clip adjacent boards where they join along a stud. Round washers are used elsewhere, except when a masonry anchor is desired, as shown in Fig. 52.

Corkboard—Usually 1½ in. thick, is attached to Mac-Mar Steel Framing using galvanized clip No. 231 as shown in Fig. 54. This clip is laid over the edge of each block of corkboard and hooked around the outer flange of the steel stud where it is held in place by a notch that falls into the stud perforations. The outer end of the clip has three prongs, one serving as a masonry anchor and the other two to hold the boards above and below.

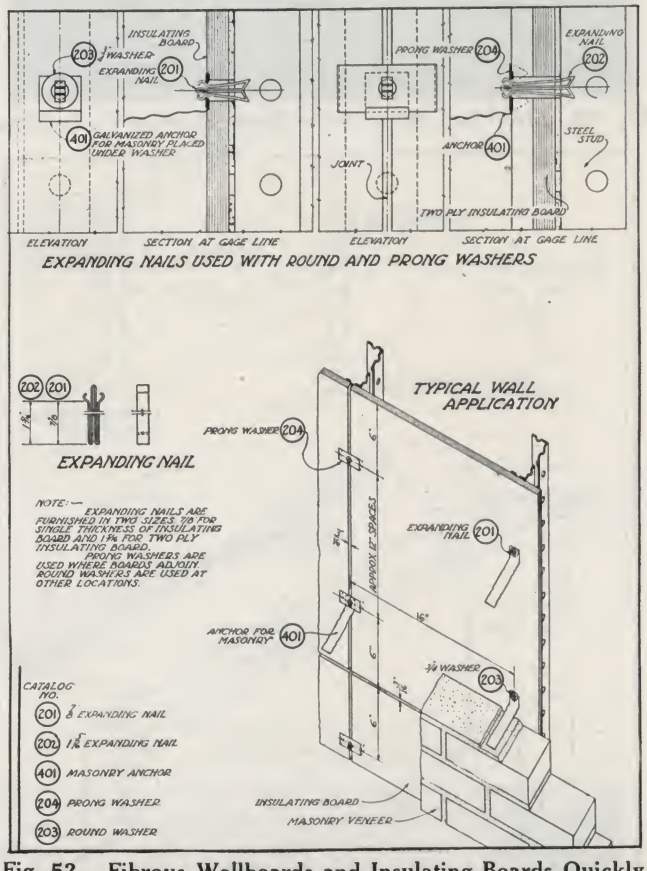

Fig. 52. Fibrous Wallboards and Insulating Boards Quickly Attached to Steel Framing with a Special Expanding Nail

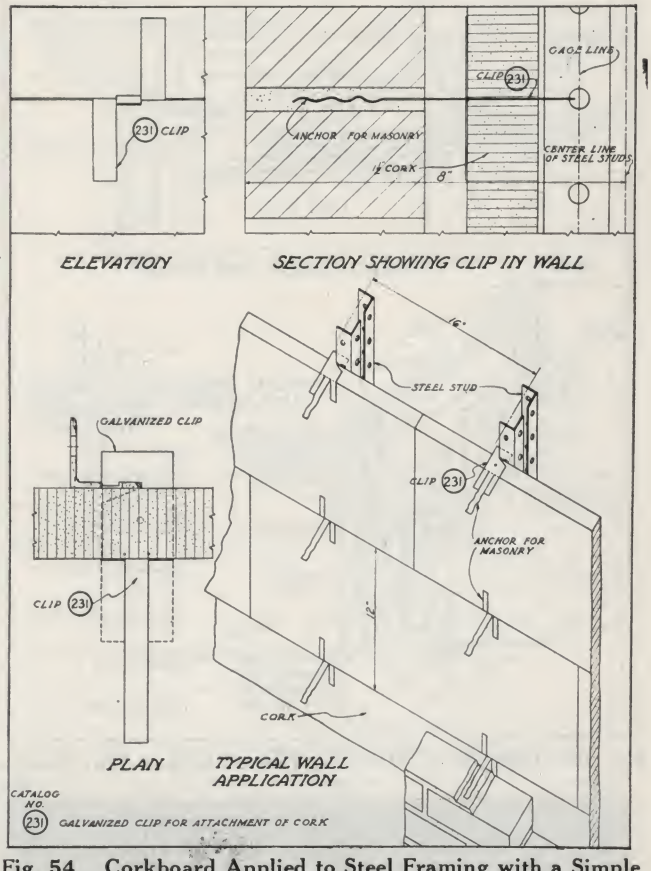

Fig. 54. Corkboard Applied to Steel Framing with a Simple Hook Clip Which Also Forms Masonry Anchor

Fig. 53. Steel Frame House at Pottstown, Pa.
Wallboards with masonry anchors ready for brickwork

Fig. 55. Corkboard Being Applied to Exterior of House at Pittsburgh, Pa.
For method see Fig. 54

Continued on next page

(B) Stucco and Plaster Bases—

Fibrous-backed wire fabrics, metal lath, gypsum wallboards or plaster boards may be used as stucco and plaster bases on Mac-Mar Steel Framing. Methods of attaching the fibrous-backed wire fabric are shown in Fig. 56, using attachment stay No. 241 where this type of material is employed on both sides of the stud, and wire clip No. 242 where on one side only. Attachment bar No. 605 is used for ceiling construction.

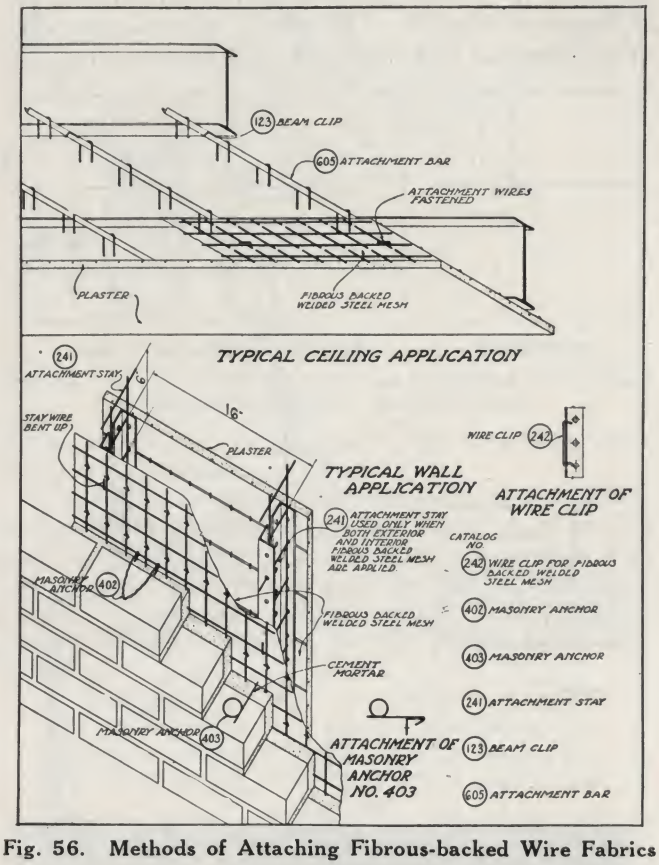

Fig. 56. Methods of Attaching Fibrous-backed Wire Fabrics

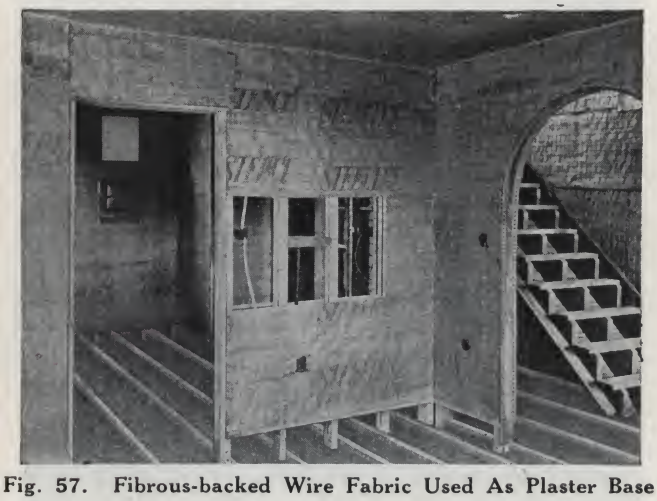

Fig. 57. Fibrous-backed Wire Fabric Used As Plaster Base

Metal lath is wired to the studs through the stud perforations as shown in Fig. 58.

Gypsum and other hard plaster boards are attached to the frame, using wire clip No. 101 as shown in Figs. 59 and 60. The illustration, Fig. 60, shows the use of wallboards on Mac-Mar Steel Studs for the construction of partitions in fireproof buildings.

Fig. 58. Metal Lath Wired to the Studs Through Perforations

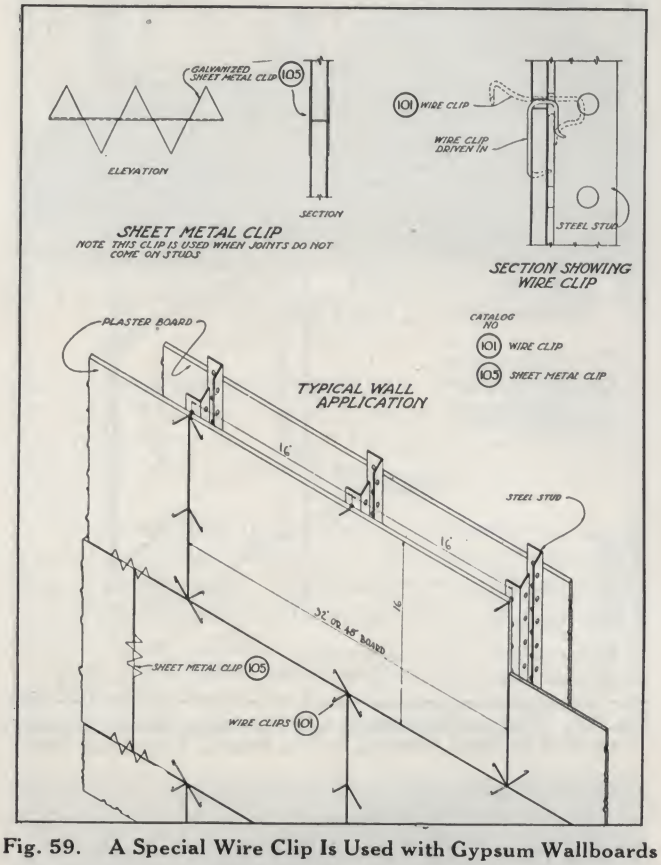

Fig. 59. A Special Wire Clip Is Used with Gypsum Wallboards

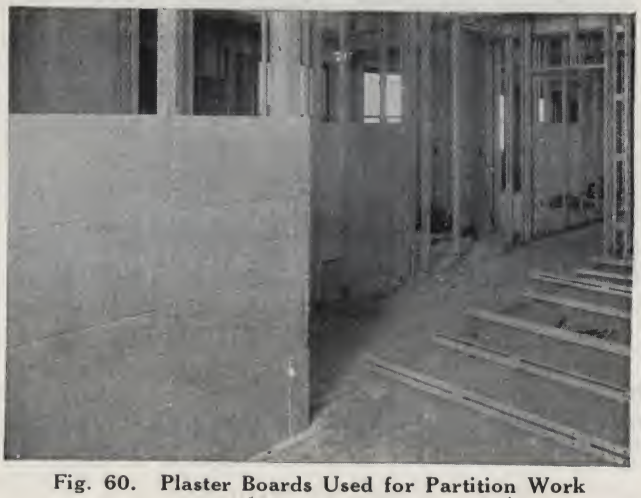

Fig. 60. Plaster Boards Used for Partition Work

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(4) Roofing and Roof Trim

The customary roof construction for Mac-Mar Steel Frame buildings is shown in Diagram A of Fig. 61. It consists of heavy wood planks nailed across the rafters to a 1¾x3¾-in. nailer strip bolted to the back of the rafter channel so that its upper edge is slightly above the upper flange of the channel.

This construction provides excellent insulating qualities and is rated as slow-burning construction, because no edges of the wood are exposed to flame. The 2-in. plank roof deck also provides a substantial nailing base for slate or tile which is not possible with ⅞-in. sheathing.

Pre-cast slabs of reinforced nailing concrete or gypsum may be used as shown in Diagram B of Fig. 61, using angle members as purlins between rafters.

Nailing concrete may also be cast in place on roofs of comparatively flat slopes, casting it upon reinforced expanded metal or fibrous-backed wire mesh as described for floor construction. See Diagram C, Fig. 61. A fourth type of construction employs a ribbed sheet metal deck with two layers of ½-in. thick insulating boards cemented to the deck with an asphalt mastic, as shown in Diagram D, Fig. 61.

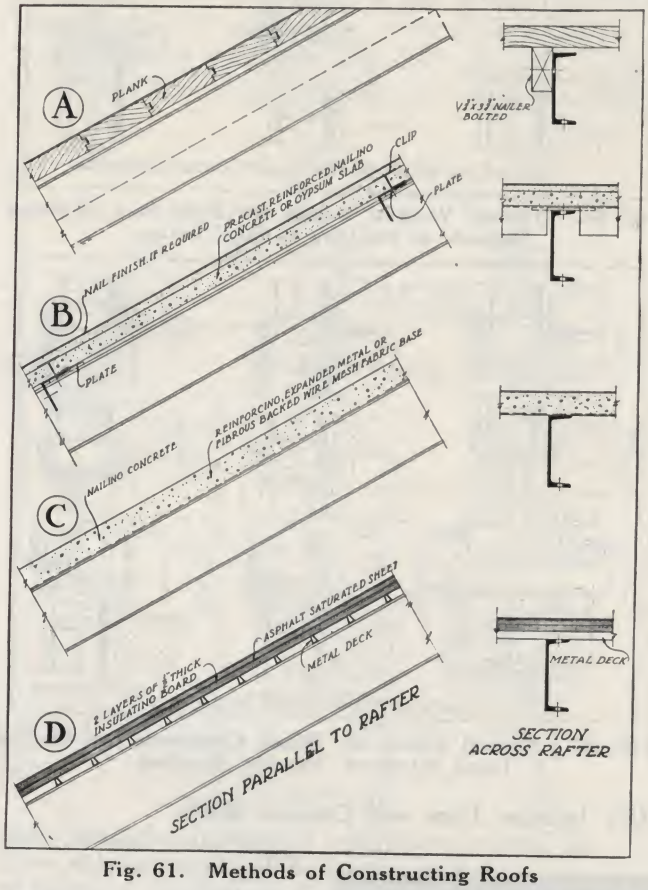

Fig. 61. Methods of Constructing Roofs

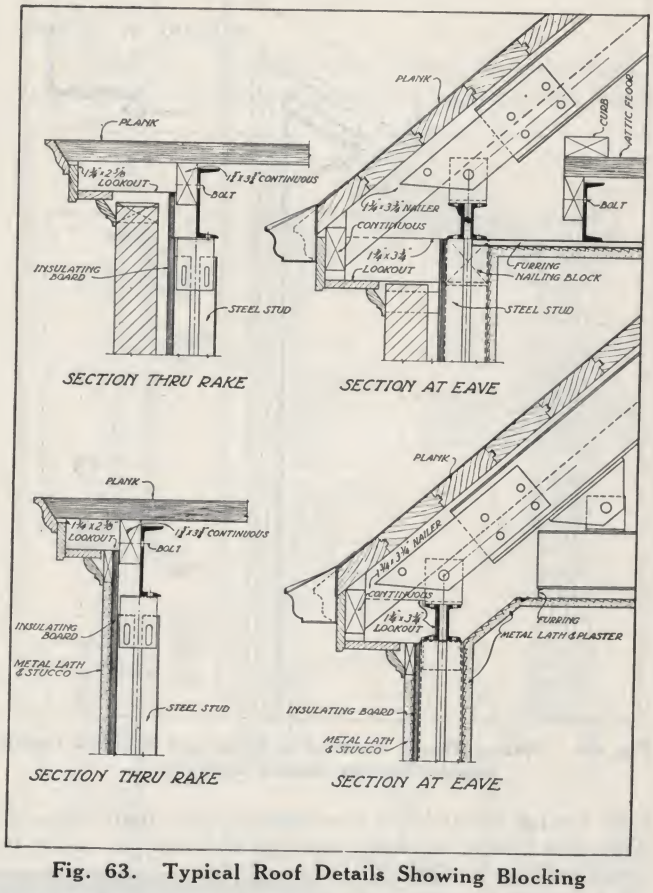

Fig. 63. Typical Roof Details Showing Blocking

Fig. 62. Roof Framing with Nailing Strips Ready for Planking
BRANDON SMITH & HAROLD RIEF, Architects, Pittsburgh, Pa.

Fig. 64. Completed House (See Fig. 62)
Note various roof treatments successfully handled with steel framing

Roof trim is attached to the eaves and rakes by means of wood blocks and lookouts attached to the rafters, studs or plates. Typical details are shown in Fig. 63. Other details are available on request for built-in gutters, open rafter cornices, dormers, porches, and similar elements. Special details are developed to provide for any type of roof detail which the designer may wish to employ.

Continued on next page

(5) Doorways and Windows

The structural framing of door and window openings consist of Mac-Mar Steel Studs set with the channels facing toward the opening, as shown in Fig. 65. The attachment of door casings and trim is made to wood nailing blocks (No. 501) which are cut to fit within the stud channel where they are held in place by nails driven through the side perforations.

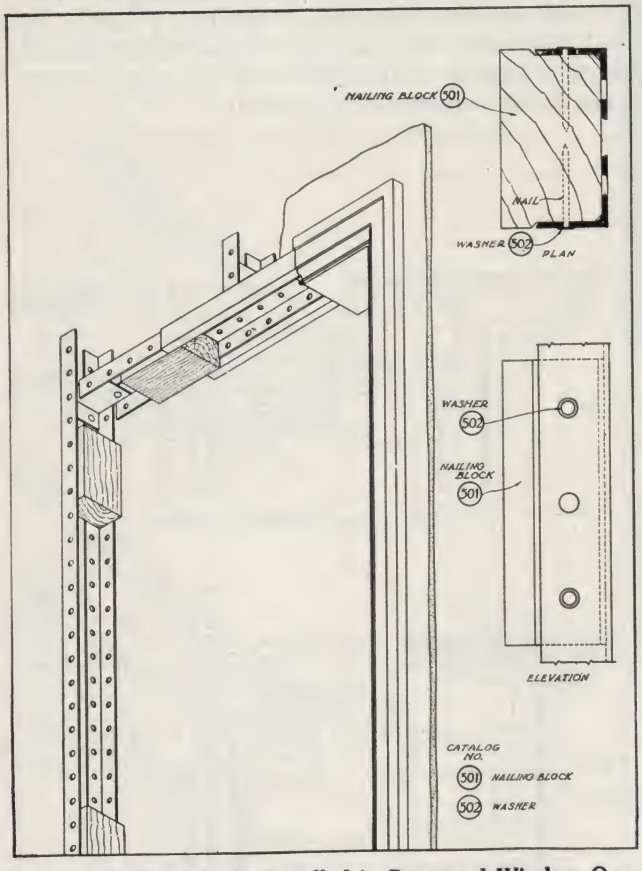

Fig. 65. Nailing Blocks Installed in Door and Window Openings to Receive Frame and Trim

These blocks are deeper than the studs, allowing for the side nailing of trim and the face nailing of frames as shown.

Wood and metal windows are installed in window openings, using similar blocking.

Typical details are shown in Figs. 66 and 67. Other details available on request.

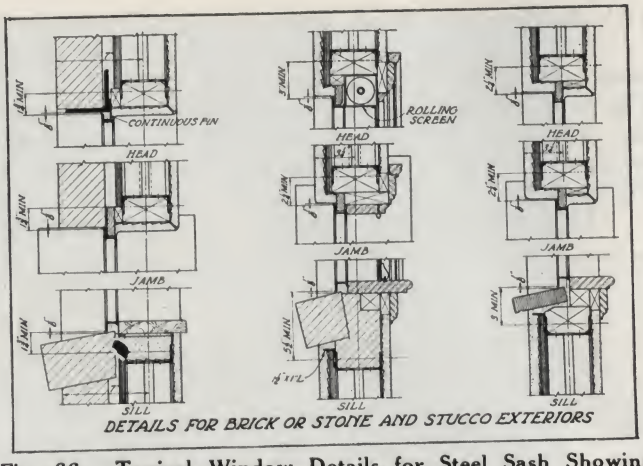

Fig. 66. Typical Window Details for Steel Sash Showing Methods of Blocking to Steel Frame

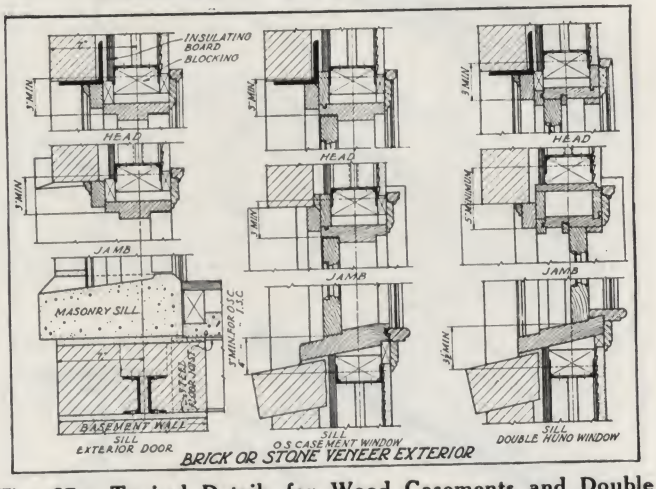

Fig. 67. Typical Details for Wood Casements and Double Hung Windows, Showing Blocking

Fig. 68. Wood Trim May Be Employed As Freely in Mac-Mar Steel Framing As in Wood Construction

(6) Interior Trim and Cabinet Work

All interior wood trim, including baseboards, chair rails, picture moulds, wood cornices, etc., is nailed in place in usual manner to wood grounds (No. 601) previously applied to the frame. These wood grounds are machine drilled and countersunk on 2-in. centers to correspond to standard spacing of studs or other members. Either expanding nail No. 201 or a key bolt, No. 221, is used for attachment of ground to studs, a simple process which is very rapid and economical. These details shown in Fig. 69; Fig. 70 gives details for other types.

HOW TO BUY MAC-MAR STEEL FRAMING

Mac-Mar Steel Framing is sold to builders, with or without erection, by more than one hundred twenty-five distributors of the Steel Frame House Company located in all of the principal centers of the United States. Write to the Steel Frame House Company, Pittsburgh, Pa., for the name and address of your nearest distributor or for direct quotations which will be submitted to you through the local representative. When seeking estimates or proposals, submit complete architectural plans of the building, including plans or diagrams showing all plumbing and heating layouts.

Estimates and quotations are cheerfully furnished without obligation.

Continued on next page

COST AND SERVICE

Cost of Mac-Mar Steel Framing

Because of the superior construction which Mac-Mar Steel Framing affords, including the use of masonry facings, fireproof concrete structural floors, metal lath and other fireproof plaster bases, the cost of a Mac-Mar Steel Frame building may range from 7% to 10% above the cost of other constructions but without these fireproof details of construction. It should be remembered that the cost of the frame itself adds only 2% or 3% to the cost of the building as compared with wood framing, and the advantages gained are obviously worth the difference. The cost of laying concrete floors or building masonry facings, and of using metal or wire lath as against non-fireproof materials may be readily figured by any experienced builder.

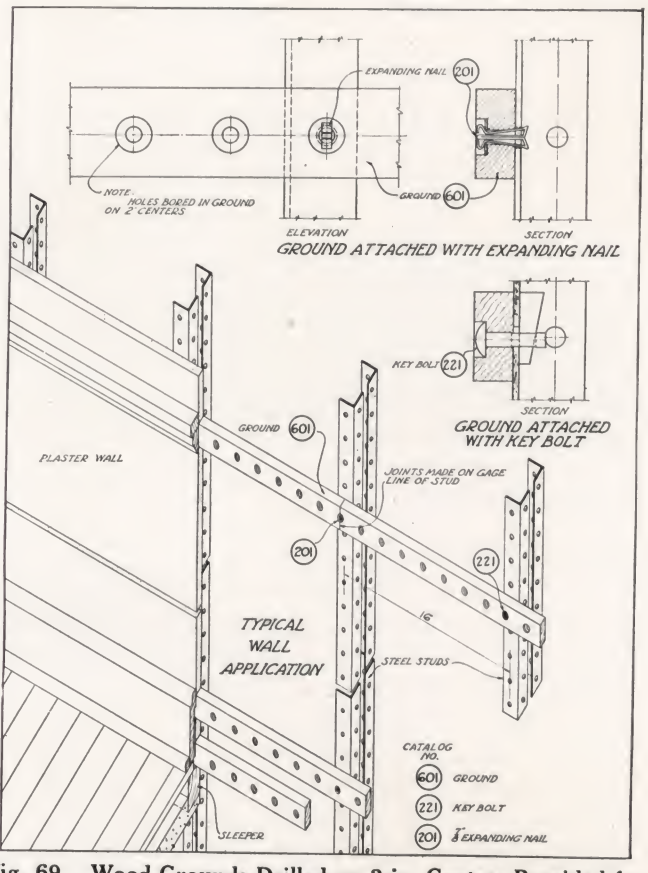

Fig. 69. Wood Grounds Drilled on 2-in. Centers Provided for the Rapid and Easy Attachment of All Types of Wood Trim

Estimating Costs

Any builder, employing Mac-Mar Steel Framing, should keep these considerations in mind when completing his estimates. The Steel Frame House Company, through its nearest representative, will give a fixed price bid for the structural framing with or without erection. The builder can estimate for himself the cost of concrete floor construction. All other details conform to standard building practices with wood framing. Foundations are identical, wall construction is normal, and the labor required to attach other building materials to the steel frame may be figured the same as for nailing to wood construction. This is due to the fact that the attachment devices and methods of construction developed by the Steel Frame House Company have been so simplified and are so rapid and easy that workmen quickly acquire the necessary facility to make these installations without added labor cost.

Service to Builders

The Steel Frame House Company will supply an experienced traveling supervisor to instruct the builder and his crew in the erection of Mac-Mar Steel Framing and in the application of various types of building materials. Where necessary this supervisor or a local representative will visit the job from time to time until the builder is thoroughly familiar with all details.

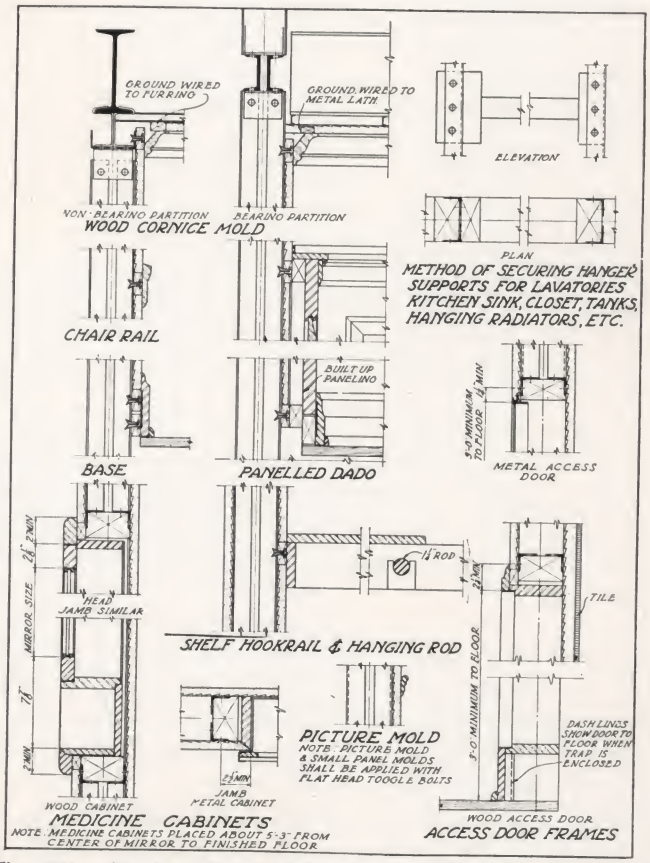

Fig. 70. Typical Details Showing Installation of Cabinet Work, Paneling, etc.

Special details are provided to meet unusual conditions

Literature and Data Sheets

The condensed instructions for building with Mac-Mar Steel Framing contained in these pages are fully amplified and developed in other publications available upon request. Write to the Steel Frame House Company for complete literature.

Remember that when you order a Mac-Mar Steel Frame, all engineering work is done by the Steel Frame House Company, which also supplies complete construction diagrams, framing details, schedules of materials and detailed instructions for assembling and finishing.

THE INVESTMENT VALUE
of
MAC-MAR STEEL FRAMING

STEEL has invaded the field of minor building construction, including modern homes, apartments, garages, shops, filling stations, schools, and hospitals, not for the sake of novelty, but wholly because steel has structural qualities possessed by no other material. The structural steel construction employed for skyscrapers and other great buildings has proved its worth through many decades of usage. The adaptation of light structural steel units to the construction of minor buildings brings to them the same qualities of strength, durability and rigidity, fire-safety and lightning protection which larger buildings possess.

MAC-MAR STEEL FRAMING

In addition, Mac-Mar Steel Framing eliminates the usual causes of plaster and stucco cracks. It is vermin-proof, free from distortion through shrinkage or warping and it possesses remarkable qualities of soundproofing and heating insulation when employed in the manner recommended by the manufacturer.

More than 160 Mac-Mar Steel Frame buildings were erected prior to January 1, 1930. Owners have lived in Mac-Mar Steel Frame houses long enough to test and prove their superior qualities.

The features they have reported as having the greatest appeal are these: Absolute freedom from plaster cracks and injury to decorations; entire confidence in their fire-safety; remarkable rigidity and soundproofness; unusual acoustical qualities improving the sound of musical instruments, radio and voices; low heating cost due to the extreme weather-tightness and insulating qualities of walls and roof; assurance of safety against lightning; and negligible maintenance and upkeep costs.

What other construction affords such sales features as Mac-Mar Steel Framing?

Protected Investments

Mac-Mar Steel Framing protects the ...'s invest-
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toward

Higher Mortgages

It is noteworthy that one of
companies in the United States h
type of steel framing for minor bui
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Marketability

Mac-Mar Steel Frame homes
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THE INVESTMENT VALUE
of
MAC-MAR STEEL FRAMING

STEEL has invaded the field of minor building construction, including modern homes, apartments, garages, shops, filling stations, schools, and hospitals, not for the sake of novelty, but wholly because steel has structural qualities possessed by no other material. The structural steel construction employed for skyscrapers and other great buildings has proved its worth through many decades of usage. The adaptation of light structural steel units to the construction of minor buildings brings to them the same qualities of strength, durability and rigidity, fire-safety and lightning protection which larger buildings possess.

In addition, Mac-Mar Steel Framing eliminates the usual causes of plaster and stucco cracks. It is verminproof, free from distortion through shrinkage or warping and it possesses remarkable qualities of soundproofing and heating insulation when employed in the manner recommended by the manufacturer.

Higher Mortgages

It is noteworthy that one of the greatest lending companies in the United States has examined every type of steel framing for minor buildings and has given its full approval only to Mac-Mar Steel Framing. Upon the completion of this survey, its experts recommended a 10% higher loan appraisal for Mac-Mar Steel Frame buildings than would be granted to a similar building built with other construction.

Marketability

Mac-Mar Steel Frame homes may be remodeled without difficulty, for all members are so fabricated as to permit the attachment of additional structural elements at any point. Parts can be taken down if necessary and the frame re-arranged or re-built with practically the same ease as wood construction.

More than 160 Mac-Mar Steel Frame buildings were erected prior to January 1, 1930. Owners have lived in Mac-Mar Steel Frame houses long enough to test and prove their superior qualities.

The features they have reported as having the greatest appeal are these: Absolute freedom from plaster cracks and injury to decorations; entire confidence in their fire-safety; remarkable rigidity and soundproofness; unusual acoustical qualities improving the sound of musical instruments, radio and voices; low heating cost due to the extreme weathertightness and insulating qualities of walls and roof; assurance of safety against lightning; and negligible maintenance and upkeep costs.

What other construction affords such sales features as Mac-Mar Steel Framing?

Protected Investments

Mac-Mar Steel Framing protects the owner's investment against depreciation, loss from fire or lightning and obsolescence which may result from the trend toward safer and more permanent construction.

Investment builders will find these features of exceptional value for the development of low-cost, fireproof apartment buildings, stores, shops, passenger vehicle parking garages, and other similar commercial and investment structures up to three stories in height which require floor loads not exceeding 100 lb. per sq. ft. Mac-Mar Steel Frame elements may be used with structural steel for the development of taller buildings.

Tax-payer buildings, erected with Mac-Mar Steel Framing, have a substantial salvage value, for when the masonry facing and plaster work are removed, the frame can be taken down and its parts used again.

Mac-Mar Steel Framing protects your investment. Use it for all your homes and other buildings where formerly you employed non-fireproof construction.

STEEL FRAME HOUSE COMPANY

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Makers of

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